

IN THE CLAIMS

Please amend the claims as follows:

1. (original) A method of encoding an audio signal (x), the method comprising, for each of a plurality of segments of the signal, the steps of:

analysing (TSA) the sampled signal values to provide one or more sinusoidal codes (Cs) corresponding to respective sinusoidal components of the audio signal;

subtracting a signal corresponding to said sinusoidal components from said audio signal to provide a first residual signal (r_1);

modelling (SE) the frequency spectrum of the first residual signal (r_1) by determining first filter parameters (Ps) of a filter which has a frequency response approximating a frequency spectrum of the first residual signal;

subtracting a signal corresponding to said first filter parameters from the first residual signal to provide a second residual signal (r_2);

modelling (RPE) a component (r_2, r_3) of the second residual signal with a pulse train coder (RPE) to provide respective pulse train parameters (L_0); and

generating (15) an encoded audio stream (AS) including said sinusoidal codes (Cs), said first filter parameters (Ps) and said pulse train parameters (L_0).

2. (original) A method as claimed in claim 1 further comprising the steps of:

modelling (TE) the temporal envelope of each second residual signal by determining second parameters (P_t), and

providing a third residual signal (r_3) by removing from the second residual signal the temporal envelope corresponding to said second parameters;

wherein said component of the second residual signal comprises a respective third residual signal (r_3) and

wherein said generating step includes said second parameters in said encoded audio stream (AS).

3. (original) A method as claimed in claim 1 further comprising the step of:

modelling (TEG) the temporal envelope of the second residual signal by determining second parameters (P_T), and

wherein said component of each second residual signal comprises said second residual signal (r_2); and

wherein said generating step includes said second parameters in said encoded audio stream (AS).

4. (currently amended) A method as claimed in ~~claims 2 or 3~~ claim 2 further comprising the step of:

estimating a difference between a signal corresponding to said pulse train parameters and said component (r_2, r_3) of each second residual signal; and

wherein said generating step includes an indicator of said difference (g) in said encoded audio stream (AS).

5. (original) A method as claimed in claim 1 wherein said pulse train coder is one of a regular pulse excitation (RPE) coder; a multiple-pulse excitation (MPE) coder; or an ACELP coder.

6. (original) A method as claimed in claim 1 wherein said first filter parameters (P_s) comprise one of: Laguerre or Linear Prediction filter parameters.

7. (currently amended) A method as claimed in claim ~~2 or 3~~ wherein said second parameters (P_T) comprise one of: Linear Prediction parameters or Line Spectral Pairs (LSP) or Line Spectral Frequencies (LSF) coefficients together with respective gains.

8. (original) A method as claimed in claim 1 wherein said method comprises the step of:

estimating (TSA) a position of a transient signal component in the audio signal;

matching a shape function having shape parameters and a position parameter to said transient signal; and

including (15) the position and shape parameters describing the shape function in said audio stream (AS).

9. (original) A method as claimed in claim 1 wherein the number of said sinusoidal components is limited by a first bit rate budget (B), wherein said pulse train coder is limited to producing said pulse train parameters (L_0) within a second bit rate budget, and wherein the sum of said first and second bit rate budgets is selected from a range according to a required quality of encoding.

10. (original) Method of decoding an audio stream, the method comprising the steps of:

reading (DeM) an encoded audio stream (AS') including, for each of a plurality of segments of an audio signal: sinusoidal codes (CS), pulse train parameters (L_0), and first filter parameters (Ps); and

employing (SiS) said sinusoidal codes to synthesize respective sinusoidal components of the audio signal;

employing (PTG) said pulse train parameters (L_0) to generate an excitation signal;

imposing (SEG) a spectral envelope according to said first filter parameters (P_s) on a first signal (r_2') a component of which comprises said excitation signal, and

adding said synthesized sinusoidal components and said spectrally filtered signal to produce a synthesized audio signal (\hat{x}).

11. (original) A method according to claim 10 wherein said encoded audio stream includes second parameters (P_T), said method comprising the step of:

imposing (TEG) a temporal envelope according to said second filter parameters (P_T) on a second signal (r_3') a component of which comprises said excitation signal, and

wherein said first signal comprises said temporally filtered signal (r_2').

12. (original) A method according to claim 11 further comprising the steps of:

generating (WNG) a white noise signal; and

adding said white noise signal to said excitation signal to provide said second signal (r_3').

13. (original) A method according to claim 12 further comprising:
high-pass filtering (We) said white noise signal.

14. (original) A method according to claim 12 wherein a gain (g) to be applied to said white noise signal is read from said audio stream.

15. (original) A method according to claim 10 wherein said encoded audio stream includes second filter parameters (P_T), the method comprising the step of:

imposing (TEG) a time domain envelope according to said second filter parameters (P_s) on said excitation signal, and

wherein said spectral envelope is imposed on said temporally filtered signal (r_2').

16. (original) A method according to claim 10 wherein said encoded audio stream includes second filter parameters (P_T), the method comprising the steps of:

generating (WNG) a white noise signal;

imposing (TEG) a time domain envelope according to said second filter parameters (P_s) on the white noise signal, and

mixing said temporally filtered white noise signal with said excitation signal to provide said second signal (r_2');

wherein said spectral envelope is imposed on said second signal (r_2').

17. (original) A method according to claim 16 wherein said mixing step comprises spectrally weighting said temporally filtered white noise signal and said excitation signal.

18. (original) Audio coder arranged to process a respective set of sampled signal values for each of a plurality of sequential segments of an audio signal (x), said coder comprising:

an analyser (TSA) arranged to analyse the sampled signal values to provide one or more sinusoidal codes (C_s) corresponding to respective sinusoidal components of the audio signal;

a subtractor arranged to subtract a signal corresponding to said sinusoidal components from said audio signal to provide a first residual signal (r_1);

a modeller (SEG) arranged to model the frequency spectrum of the first residual signal (r_1) by determining first filter

parameters (Ps) of a filter which has a frequency response approximating a frequency spectrum of the first residual signal;

a subtractor arranged to subtract a signal corresponding to said first filter parameters from the first residual signal to provide a second residual signal (r_2);

a modeller (RPE) arranged to model a component (r_2, r_3) of the second residual signal with a pulse train coder (RPE) to provide respective pulse train parameters (L_0); and

a bit stream generator (15) for generating an encoded audio stream (AS) including said sinusoidal codes (Cs), said first filter parameters (Ps) and said pulse train parameters (L_0).

19. (original) Audio player, comprising:

means for reading (DeM) an encoded audio stream (AS') including, for each of a plurality of segments of an audio signal: sinusoidal codes (CS), pulse train parameters (L_0), and first filter parameters (Ps); and

a synthesizer (SiS) arranged to employ said sinusoidal codes to synthesize respective sinusoidal components of the audio signal;

means (PTG) for generating an excitation signal from said pulse train parameters (L_0);

means for imposing (SEG) a spectral envelope according to said first filter parameters (Ps) on a first signal (r_2') a component of which comprises said excitation signal, and

an adder for adding said synthesized sinusoidal components and said spectrally filtered signal to produce a synthesized audio signal (\hat{x}).

20. (currently amended) Audio system comprising an audio coder as claimed in claim 18 ~~and an audio player as claimed in claim 19.~~

21. (original) Audio stream (AS) comprising sinusoidal codes (Cs) corresponding to respective sinusoidal components of an audio signal (x); first filter parameters (Ps) for a filter which has a frequency response approximating a frequency spectrum of a first residual signal, said first residual signal corresponding to said audio signal with a signal corresponding to said sinusoidal components subtracted; and pulse train parameters (L_0) modelled from a component (r_2, r_3) of a second residual signal, said second residual signal corresponding to first residual signal with a signal corresponding to said first filter parameters subtracted.

22. (original) Storage medium on which an audio stream (AS) as claimed in claim 21 has been stored.